19. An optical system according to claim 13, wherein a radius of curvature of the curved surface lies within the range of $0.5\ \mu m < r < 2\ \mu m$.--.

REMARKS

Reconsideration and allowance of the subject application are respectfully requested in view of the preceding amendments and the following remarks.

Claims 1-7 and 9-19 are pending in the application. Claims 1-7 and 9-12 are independent.

Claims 1-3, 5, 6 and 8 were rejected under 35 U.S.C. § 112, second paragraph, as indefinite. Claim 8 has been canceled without prejudice, and Claims 1-3, 5 and 6 have been amended taking into consideration the Examiner's comments. No new matter has been added.

Claims 5-7 were objected to as being duplicates of Claims 2-4. Claims 2-7 have been amended herein. Reconsideration and withdrawal of the objections are requested.

Claim 1 was rejected under 35 U.S.C. § 102 by, or in the alternative, under 35 U.S.C. § 103 as obvious over,

U.S. Patent No. 5,048,925 to Gerritsen, et al. Claims 4, 7, 8/4 and 8/7 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 5,283,690 to Miyake, et al. Claim 8/1 was rejected under 35 U.S.C. § 103 as being unpatentable over Gerritsen, et al. Claim 8 has been canceled and the rejection of the remaining claims is traversed.

Independent Claim 1 is directed to a diffractive optical element and recites a pair of diffraction gratings. As recited, each of the diffraction gratings has a saw-toothed sectional shape, and the pair of diffraction gratings differ in dispersion from each other. The pair of diffraction gratings confront each other through a space of a refractive index of 1. Further, a maximum optical path length difference occurring in the pair of diffraction gratings with the space with respect to each of at least two wavelengths is integer times an associated wavelength.

Applicant submits that at least the above-identified features of the present invention recited in independent Claim 1 are neither disclosed nor suggested by the cited art. Gerritsen, et al. is directed to quasi-volume diffracting structures. As understood, Gerritsen, et al.

provides, for example, at least two outer diffraction elements and an intermediate diffraction element. The diffraction elements form a structure for directing incident radiation in a selected direction.

However, Applicant submits that Gerritsen, et al. does not disclose or suggest at least a pair of diffraction gratings with the structure recited in Claim 1, wherein a maximum optical path length difference occurring in the pair of diffraction gratings with a space with respect to each of at least two wavelengths is integer times an associated wavelength, as provided by the present invention recited in independent Claim 1.

Applicant notes that the Office Action indicates that the feature of a "maximum optical path difference is an integer multiple of a design wavelength" is either inherent or obvious. With respect to inherency, Applicant respectfully submits that MPEP § 2112 states "[t]he fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic.... In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the

determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Citations omitted, emphasis in original.

With regard to obviousness, Applicant notes that MPEP § 2143 states that to establish a prima facie case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. The mere fact that a reference can be modified does not render the resultant modification obvious. Citations omitted.

Here, Applicant submits that there has been no showing that a feature of a maximum optical path length difference occurring in a pair of diffraction gratings with a space with respect to each of at least two wavelengths is integer times an associated wavelength must necessarily flow from the prior art. Accordingly, Applicant submits that there has been no showing that such features are inherent. Further, although it may be possible to modify the prior art to achieve such features, the mere fact that the art could be so modified does not render the claimed features obvious.

For at least the foregoing reasons, reconsideration and withdrawal of the rejection of Claim 1 are requested.

With regard to the rejection of independent Claims 4 and 7, Claim 4 is directed to a diffractive optical element having a pair of diffraction gratings. As recited, each of the diffraction gratings has a saw-toothed sectional shape, and the pair of diffraction gratings differ in dispersion from each other. The pair of diffraction gratings confront each other through a space of a refractive index of 1. Further, a maximum optical path length difference occurring in the pair of diffraction gratings with the space with respect to each of at least two wavelengths is integer times an associated wavelength. Peak portions of the pair of diffraction gratings are formed in a chamfered shape.

Claim 7 is directed to a diffractive optical element. As recited, a pair of diffraction gratings each of which has a saw-toothed sectional shape are provided. The pair of diffraction gratings differs in dispersion from each other, and the pair of diffraction gratings confront each other. As recited, a maximum optical path length difference occurring in light passing through the pair of diffraction

gratings with respect to each of at least two wavelengths is integer times the associated wavelength. Further, valley portions of the pair of diffraction gratings are formed in a chamfered shape.

Applicant submits that Miyake, et al. does not disclose at least these features of the present invention recited in Claims 4 and 7. Miyake, et al. is directed to an optical diffraction grating element having, for example, diffraction gratings each with grooves and flat lands. As understood, the grooves and flat lands are successively alternately formed, and the diffraction gratings may have the same groove depth, groove width and groove tilt angle, while the pitches of the diffraction gratings may be made different.

However, Applicant submits that Miyake, et al. does not disclose at least a pair of diffraction gratings configured in the manner recited in Claim 4, herein a maximum optical path length difference occurring in the pair of diffraction gratings with a space with respect to each of at least two wavelengths is integer times an associated wavelength, and peak portions of the pair of diffraction

gratings are formed in a chamfered shape, as provided by the present invention recited in Claim 4.

Applicant further submits that Miyake, et al. does not disclose at least a pair of diffraction gratings configured as recited in Claim 7, wherein a maximum optical path length difference occurring in light passing through the pair of diffraction gratings with respect to each of at least two wavelengths is integer times an associated wavelength, and valley portions of the pair of diffraction gratings are formed in a chamfered shape, as provided by the present invention recited in Claim 7.

For at least the foregoing reasons, Applicant submits that the present invention recited in independent Claims 1-7 and 9-12 is patentable over the cited art.

The dependent claims should also be deemed patentable for depending from allowable independent claims and for introducing further patentable features of the present invention. Separate and individual consideration of the dependent claims are respectfully requested.

Newly-presented independent Claims 9-12 are believed to be allowable for reasons similar to those advanced above with respect to Claims 1, 4 and 7.

Specifically, independent Claim 9 recites features wherein a maximum optical path length difference occurring in a pair of diffraction gratings with a space with respect to each of at least two wavelengths is integer times an associated wavelength. Further, peak portions of one of the pair of diffraction gratings are formed in a chamfered shape, and valley portions of the other of the pair of diffraction gratings are formed in a chamfered shape.

Independent Claim 10 recites features wherein a maximum optical path length difference occurring in light passing through a pair of diffraction gratings with respect to each of at least two wavelengths is integer times an associated wavelength. Further, peak portions of one of the pair of diffraction gratings are formed in a chamfered shape, and valley portions of the other of the pair of diffraction gratings are formed in a chamfered shape.

Claim 11 recites features wherein a maximum optical path length difference occurring in a pair of diffraction gratings with a space with respect to each of at least two wavelengths is integer times an associated wavelength, wherein the integer is a number of a specific order.

Claim 12 recites features wherein a maximum optical path length difference occurring in light passing through a pair of diffraction gratings with a space with respect to each of at least two wavelengths is integer times an associated wavelength.

Applicant submits that newly-presented independent Claims 9-12 are patentable over the cited art for reasons similar to those advanced above with respect to Claims 1, 4 and 7 and should also be deemed allowable. The newly-presented independent claims should be deemed allowable for depending from allowable independent claims.

Thus, Applicant submits that the subject application is in condition for allowance. Favorable reconsideration, withdrawal of the objections and rejections set forth in the above-noted Office Action, and an early Notice of Allowance are requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010.

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Respectfully submitted,

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